SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Revised Preliminary Draft Staff Report

Proposed Rule 445 - Wood Burning Appliances

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EXECUTIVE SUMMARY

Emissions from wood burning for aesthetic and heating use in southern California do contribute to exceedances of State and federal air quality standards for PM10 and PM2.5, collectively referred to as particulate matter or PM. Wood burning can also produce carbon monoxide and toxic air contaminants. The 2003 Air Quality Management Plan (AQMP) included a control measure to reduce PM emissions from wood burning fireplaces and wood stoves.[1] The California Air Resources Board (ARB) has also developed a suggested control measure to reduce emissions from wood burning appliances and other sources.[2] Air districts and states have developed wood smoke control programs with varying degrees of stringency, based primarily on local conditions, climate and other factors. Proposed Rule 445 has been developed to assist in the attainment of State and federal PM standards for the South Coast jurisdiction.

Staff research indicates that properly installed, operated and well-maintained clean burning appliances significantly reduce emissions inside and outside of the home. The primary focus of the Proposed Rule and outreach program is to phase-out less efficient wood-burning appliances and educate the public on how to burn wood in a clean manner.

Proposed Rule 445, beginning twelve months after adoption, would require all new wood burning appliances sold or installed in the District to be one of the cleanest technologies available. Proposed Rule 445 requires wood burning appliances to be installed and operated in accordance with the manufacturer's specifications and prohibits the burning of non-wood items such as trash. Proposed Rule 445 also requires the replacement or removal of older wood heaters during property transfers made after 2012 in areas with high fine particulate matter concentrations. A complete exemption is provided for cookstoves and an exemption from the property transfer requirements is provided for properties in historic districts. In conjunction with the comprehensive Proposed Rule 445 outreach program, District staff will inform the public when it is not advisable to burn wood due to the potential for adverse health effects through a voluntary wood burning curtailment program.

The 2003 and 2007 AQMPs estimated emissions from wood burning stoves and fireplaces at approximately six tons of PM2.5 per annual average day, and nearly 11 tons per winter day. A recent review of the emissions inventory estimates PM2.5 emissions to range from approximately 10 to 20 tons per annual average day and up to 30 tons per day during periods with greater wood burning (generally, November through February). A discussion of key variables for the emissions inventory and potential uncertainties is presented later in this report. Emissions reductions for the Proposed Rule 445 requirements have been estimated at approximately 25 tons of PM2.5 per year by 2008, increasing to 175 tons of PM2.5 per year by 2014. The emission reductions quantified for Proposed Rule 445 represent staff's best estimate based on the most recent data and available information. Staff anticipates that implementation of the voluntary wood burning curtailment program and other provisions of the proposed rule will generate additional emission reductions through response to public outreach and education as compared to what is contained in the AQMP control measure. The reductions specified in the 2007 draft AQMP control measure represent the lower bound of feasible reductions.

[1] *Control Measure #2003MSC-06, http://www.aqmd.gov/aqmp/docs/2003AQMP_AppIVa.pdf - page IV-60*

[2] ARB, Proposed List of Measures to Reduce Particulate Matter – PM10 and PM2.5, (Implementation of Senate Bill 656, Sher), Approved November 18, 2005

RULE REVISIONS MADE SUBSEQUENT TO THE PUBLIC WORKSHOP

During working group meetings held in 2006 and 2007 and at a Public Workshop held in January of 2007, AQMD staff received suggestions and comments regarding Proposed Rule 445. In response to these comments and suggestions, several revisions to Proposed Rule 445 have been made since release of the preliminary draft staff report. These revisions are summarized below and additional discussion is provided in the Summary of Rule Requirements section of this report.

- The definition of a "gaseous-fueled residential hearth appliance" has been replaced with "dedicated gaseous-fueled fireplace" to include units, such as gas logs. A companion requirement has been added that prohibits the removal of the operating system in any gaseous-fueled fireplace.
- The paragraph (d)(1) effective date for standards for new construction projects and remodels has been increased from 6 to 12 months to provide a transition period that allows the completion of already approved construction projects and will allow AQMD staff to conduct the necessary outreach activities.
- The list of permissible wood burning appliances for new construction projects and remodels has been expanded to include a low emission fireplace that is determined to meet the criteria established by the U.S. EPA Voluntary Low Emission Fireplace program.
- To improve clarity, the exemption for dedicated gaseous-fueled hearth appliances has been removed and has been added to the list of acceptable fireplaces listed for new construction projects or remodels.
- The proposed restriction of no more than one wood burning appliance for new construction projects and remodels has been removed, as it is very unlikely that more than one wood burning appliance would be operated at the same time.
- The provision that would require change-out of older wood burning appliances upon sale or transfer of real property will be implemented only after a public hearing regarding which areas exceed 20 $\mu g/m^3$ ambient concentrations.
- The prohibition of firewood advertised or sold as seasoned unless the moisture content is less than 20 percent has been removed from the proposed rule and information on properly seasoned firewood will be presented to the public in conjunction with a comprehensive outreach program.
- The episodic wood burning curtailment program is now voluntary and will not be included in the proposed rule. The voluntary wood burning curtailment program will be based on forecasted meteorological and Air Quality Index (AQI) levels and will be presented to the public in conjunction with a comprehensive outreach program.
- The requirement that prohibits commercial facilities from using uncontrolled wood burning devices after 2010 has been removed because staff research indicates that there are very few of these facilities and the amount of wood burned at each is far less than previous estimates.
- An exemption from the property transfer requirements has been added for properties in historic districts.

REGULATORY BACKGROUND

The District monitors ambient air quality for criteria pollutants (ozone, carbon monoxide, particulate matter, lead and sulfate) at 32 locations within the South Coast Air Basin (Basin) and the Coachella Valley portion of the Salton Sea Air Basin (SSAB). Pollutant concentrations exceed federal and/or State standard(s) for suspended particulate matter (AQMP, 2003). In accordance with a court order, U.S. EPA published revised particulate matter standards on October 17, 2006.[3] The new standards, including the revocation of the PM10 annual average standard, took effect 60 days from federal register publishing. Under the newly issued PM standards, the prior 24-hour PM10 standard has been retained at 150 $\mu g/m^3$ as with the PM2.5 annual average standard at 15 $\mu g/m^3$. The prior 24-hour PM2.5 standard was, however, reduced from 65 to 35 $\mu g/m^3$. Although final designations have not been made by U.S. EPA, data suggests that the Basin will be classified as non-attainment under the newly issued PM2.5 standards and the Coachella Valley will be designated as unclassifiable. Both the Basin and the Coachella Valley are classified as non-attainment for the State PM10 standard (50 $\mu g/m^3$ on a 24-hour basis and 20 $\mu g/m^3$ for the annual average). The Basin is also classified as non-attainment for the State PM2.5 annual average standard (12 $\mu g/m^3$) while the Coachella Valley is designated as unclassified.

HEALTH EFFECTS FROM FINE PARTICULATE MATTER[4]

A consistent correlation between elevated ambient fine particulate matter (PM10 and PM2.5) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, studies have reported an association between long-term exposure to air pollution dominated by fine particles (PM2.5) and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Recent studies show lung function growth in children is reduced with long-term exposure to particulate matter. The elderly, people with pre-existing respiratory and/or cardiovascular disease, and children appear to be more susceptible to the effects of PM10 and PM2.5.

A recent study by the California Air Resources Board estimated that the elevated PM2.5 levels here in the South Coast Air Basin result in 5,400 premature deaths, 140,000 asthma/lower respiratory symptoms and 980,000 lost work days per year based on 1999/2000 air quality data. Another study showed that 82 percent of California's exposure and 52 percent of national exposure to PM2.5 concentrations above federal air quality standards occurs here in southern California.

[3] PM10 refers to Particulate Matter with an aerodynamic diameter of 10 microns or less and PM2.5 refers to Particulate Matter with an aerodynamic diameter of 2.5 microns or less.

[4] Chapter 2, Air Quality and Health Effects, 2007 Draft Air Quality Management Plan, South Coast Air Quality Management District.

Health Effects from Wood Smoke

Wood smoke is generally in the fine fraction of PM with most particles having an aerodynamic diameter of 2.5 microns or less. Wood smoke is comprised of nitrates, microscopic pieces of fly ash, dust, smoke, and soot as well as polycyclic organic hydrocarbons. Wood smoke is usually released near ground level in populated areas and is especially apt to be breathed by many residents. The health effects of household and neighborhood wood smoke have been studied extensively. The greatest health effect from wood smoke originates from fine particles that can cause health problems ranging from minor irritations such as burning eyes and runny noses to chronic illnesses such as bronchitis. Fine particles also can aggravate chronic heart and lung diseases and are linked to premature deaths in people with these conditions. Persons that may be more susceptible to health effects from wood smoke include those with existing heart or lung disease (congestive heart failure, angina, chronic obstructive pulmonary disease, emphysema or asthma), the elderly, and the young.[5] A literature search of available studies (Boman, et al, 2003) also recently concluded that there is no reason to assume that the effects of particulate matter in areas polluted with wood smoke are weaker than elsewhere [e.g., areas with similar ambient PM concentrations not affected by wood smoke]. Conclusions in a more recent health effects study included a statement that there is no persuasive evidence that wood smoke particles are significantly less dangerous for respiratory disease than other major categories of combustion-derived particles in the same size range (Naeher, et al, 2007). The same study did acknowledge, however, that there is too little evidence available to make a judgment concerning the relative toxicity of wood smoke particles with respect to cardiovascular or cancer outcomes.

OTHER AGENCY EFFORTS TO REDUCE WOOD SMOKE EMISSIONS

National Efforts to Reduce Wood Smoke Emissions

The U.S. EPA has previously adopted New Source Performance standards for new wood heaters (wood stoves and fireplace inserts) sold since 1992.[6] Currently, there are no federal certification requirements for traditional fireplaces that have an air-to-fuel ratio in excess of 35:1, as a suitable test method has not been developed. An ASTM Fireplace Task Group has developed an emissions and measurement draft protocol which may be used by U.S. EPA and/or individual states to set emission thresholds for low emission fireplaces, however, these efforts are ongoing (Stegmeir, 2006).

In addition to the New Source Performance standards for wood burning stoves and fireplace inserts developed by the U.S. EPA, a variety of programs have been initiated to assist in the removal of older wood burning technologies and replacement with cleaner technologies. Specifically, the U.S. EPA has initiated the Great American Woodstove Change-Out program to assist local agencies in developing and implementing programs intended to reduce emissions from wood stoves. Under the program, agencies and hearth retailers have provided financial incentives for the replacement of non-certified wood stoves with U.S. EPA Phase II-certified appliances. The Energy Policy Act, approved on August 8 of 2005, also establishes a rebate program for the purchase of renewable/biomass energy-fueled appliances with an

[5] US EPA Fact Sheet, Health Effects of Wood Smoke, http://www.epa.gov/woodstoves/healtheffects.html
[6] 4.1 grams PM per hour for catalytic heaters and 7.5 grams per hour for non-catalytic heaters

efficiency of at least 75 percent (Title II, subtitle A, Section 106), however, funding and implementation mechanisms must be resolved.

California Air Resource Board Efforts to Reduce Wood Smoke Emissions

In 1989, the California Air Resources Board (ARB) adopted a suggested control measure (SCM) to reduce emissions from wood burning appliances. A summary of the most promising potential control actions from ARB's SCM include:

Voluntary Curtailment Program: This program encourages the public to refrain from use of wood heaters and fireplaces when air quality is expected to be poor.

Public Awareness Programs: The goal is to inform the public about the proper operation and maintenance of wood heaters and health effects of wood smoke.

Replacement of Existing Wood Heaters: Upon the sale of real property that contains a wood heater, the heater must be clean burning as reflected by an U.S. EPA-certified, Oregon-certified, or pellet-fueled wood heater.

Moisture Content of Seasoned Wood: Dry wood burns more efficiently; therefore firewood that is offered for sale as "seasoned wood" must have a moisture content of 20 percent by weight or less.

Prohibited Fuel Types: Garbage, treated wood, plastic, rubber, waste petroleum products, paints and paint solvents, and coal having a sulfur content exceeding more than one percent by weight are prohibited from being burned in a wood-burning appliance.

California Air District Efforts to Reduce Wood Smoke Emissions

Many California air districts have developed programs/regulations to reduce emissions from wood burning appliances including the Bay Area Air Quality Management District, the San Joaquin Valley Unified Air Pollution Control District and the Sacramento Metropolitan Air Quality Management District. These programs vary in stringency based on climate and local concerns.

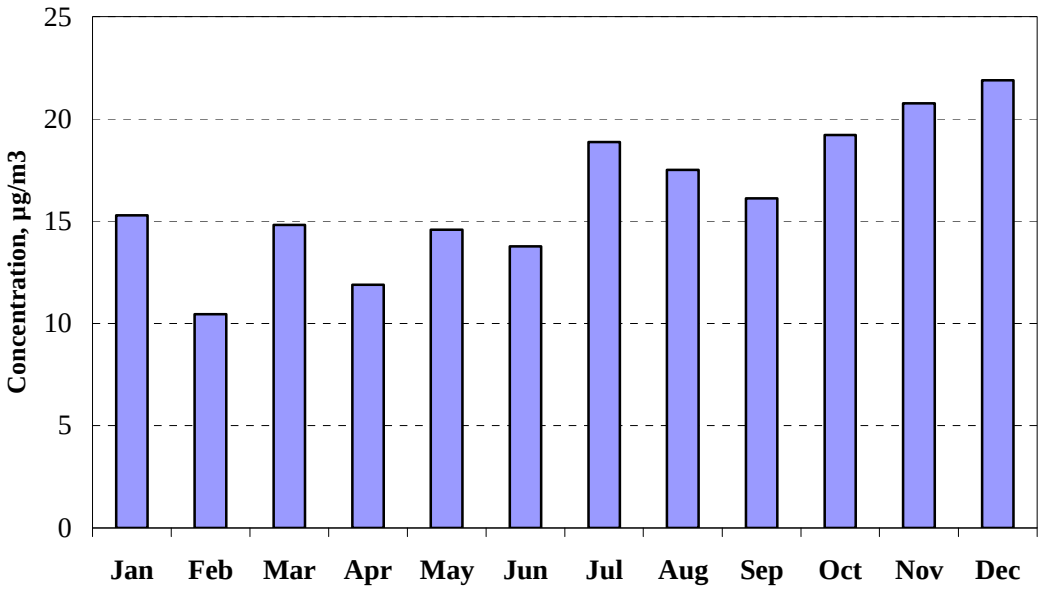
PM2.5 AIR QUALITY IN THE SOUTH COAST AIR BASIN

PM2.5 is monitored at various sites throughout the District. Unlike ozone that has a predictable summertime increase; ambient PM2.5 measurements tend to be higher in the third and fourth quarters of the year. Figure 1 shows the average PM2.5 concentration for each month in the Basin for the year 2005.

In addition to emissions inventory information, the magnitude of wood smoke's contribution to ambient PM levels can be estimated through receptor modeling. Receptor modeling is intended to account for specific chemical compounds collected on air sampling filters by matching them against known sources of those chemical compounds. By comparing the collected particulate mass and composition to known source emissions profiles, it is possible to attribute the measured mass to its emissions sources. The term chemical mass balance is commonly used for such calculations. Using these methodologies, a study analyzing 1982 data estimated that wood smoke contributed 9.6, 5.7, 10.8, and 1.3 percent of PM2.5 mass on

an average annual basis at Pasadena, Downtown Los Angeles, West Los Angeles, and Rubidoux, respectively (Schauer, 1996).

Figure 1
PM2.5 Seasonal Variation, 2005
Monthly Average Concentration in the Basin, µg/m^3



More recently, the organic compound levoglucosan has been identified as a tracer for wood smoke (Schauer and Cass, 2000). Figures 2 and 3 present the estimated contribution of wood smoke to ambient PM10 levels using the chemical mass balance model (Phase II of the Children's Health Study, ARB, 2001). Figure 2 presents 1995 data for November and December while Figure 3 presents data during the May through November time period. It should be noted that the information presented in Figures 2 and 3 do not include emissions from paved road dust (largest source category) or secondary PM10 emissions (e.g., ammonium nitrate and sulfate).

As illustrated in Figure 2 (winter months), the estimated contribution of wood smoke to ambient PM10 levels ranges from a low of less than one microgram per cubic meter (µg/m^3) in the mountain community of Crestline to nearly four µg/m^3 in the community of Mira Loma. This can be compared with diesel exhaust emissions that range from less than one µg/m^3 in Crestline to approximately six µg/m^3 in Mira Loma. As would be expected, the data in Figure 3 (Spring-Summer months) shows a smaller contribution of wood smoke to ambient PM10 mass (generally less than 0.4 µg/m^3). A comparison of Figure 2 and 3 also shows that diesel exhaust emission estimates are generally consistent throughout both evaluation periods.

Increased use of outdoor firepits fueled by wood could alter this balance in any future examination of post 1995 data.

Public Complaints

Another measure of the severity of wood smoke contribution to ambient air quality is public complaints regarding a source. District staff evaluates and responds to public complaints via

a toll-free hotline 24 hours each day. Based on a review of the AQMD's records, public complaints are received concerning smoke but it is difficult to determine the specific number attributable to residential wood burning as most complaints only identify smoke from an unknown source. However, residential complaints have been received regarding the burning of trash in fireplaces and wood stoves. A review of 2003 to 2006 data indicates 32 complaints where the complainant or AQMD staff identified the source as wood burning at a residence (Caso, 2006). In addition to the formally filed complaints, AQMD staff have received numerous complaints and observations from the public about wood smoke during public forums such as AQMP workshops and AQMD Town Hall meetings.

Figure 2

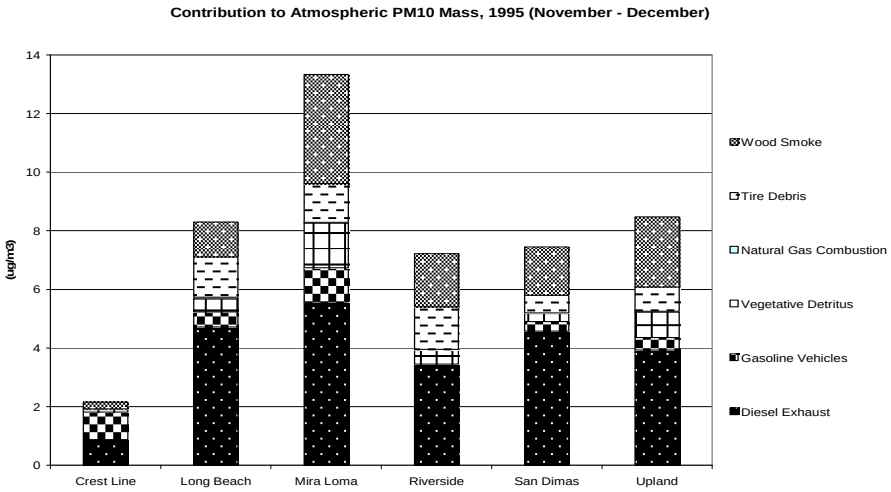
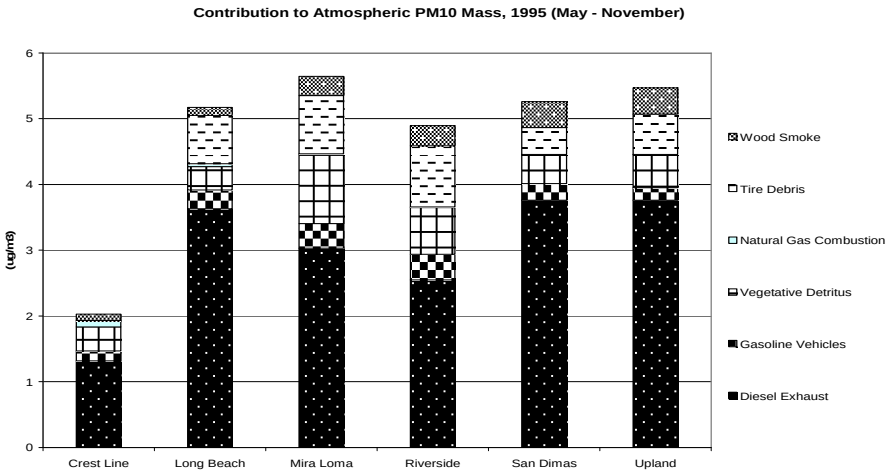


Figure 3



PURPOSE AND APPLICABILITY

The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air from wood burning appliances. Proposed Rule 445 applies to the sale, installation and use of wood burning appliances. The Proposed Rule would affect large and small businesses and the general public. Examples of large businesses include the building industry and manufacturers of wood burning appliances. Smaller businesses affected would be retailers,

chimney sweeps, and wood suppliers. The general public that burns wood would also be affected by the Proposed Rule.

LEGAL AUTHORITY

The AQMD obtains authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, and 40001.

AFFECTED INDUSTRY

Traditional wood burning fireplaces, and stoves to a lesser degree, are nearly ubiquitous in existing single family houses and condominiums, and are also widely available in new home construction. The following background information was obtained from ARB[7] and the U.S. EPA[8] documents.

The types of devices that burn wood in a typical residence are: 1) fireplaces, 2) fireplace inserts, and 3) wood burning stoves (includes subcategories). The most common wood burning device in a home is the traditional, uncontrolled fireplace. A fireplace is generally masonry or, more recently, a prefabricated (metal), enclosure with the combustion area facing the interior of the house and a chimney to exhaust the flue gas. Combustion air can be supplied from outside air or from inside air. A fireplace is an inefficient method of heating a house and in some cases can have a negative heating efficiency, if the inside air is used as combustion air. Specifically, when inside air is used for combustion air the colder outside air will be drawn into the house to balance the inside air loss due to combustion. Constant owner attention is required to assure safety and efficiency.

Fireplace inserts are devices that fit into a fireplace. Fireplace inserts that burn wood, pellets, or gaseous fuels are commercially available and can provide similar efficiencies as wood burning stoves. U.S. EPA Phase II-certified wood and pellet burning inserts are also available. These devices can be used to heat a house, or a portion of the house, by radiating heat into the interior house space or, with the aide of a fan, circulating air around the insert and venting heated air into the house. The result is better fireplace heating performance and a safer system.

Wood stoves are stand alone devices that vent flue gas through an existing chimney or flue. They are enclosed wood heaters that control burning or burn time by restricting the amount of air that can be used for combustion. Wood stoves are used both as the primary source of residential heat and to supplement conventional heating systems. Based on known variations in construction, combustion, and emission characteristics, there are five different wood stove subcategories: (1) the conventional [non-EPA Phase II-certified] wood stove; (2) the non-catalytic U.S. EPA Phase II-certified wood stove; (3) the catalytic U.S. EPA Phase II-certified wood stove; (4) the pellet stove; and (5) the masonry heater. The newer, certified models, as well as the pellet and masonry units have significantly improved safety and efficiency characteristics. Electric fireplaces (primarily decorative but some have heating elements)

[7] ARB (California Air Resources Board), Area Source Methodology, Section 7.1, Residential Wood Combustion, July 1997

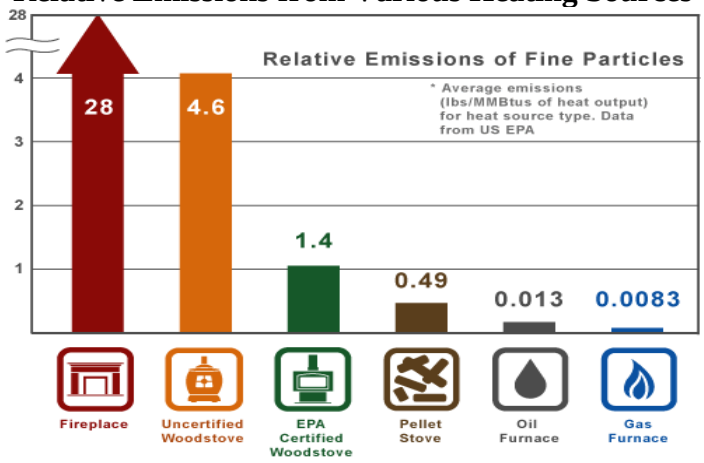
[8] EPA, AP-42, Section 1.9, Residential Fireplaces, October 1996

have also been developed by industry, as fireplace inserts or wall mounted devices but the extent of their use in the southern California market is unknown.

A survey of five to six new housing developments in each of the Basin's four counties was conducted by AQMD Compliance staff to determine what types of fireplaces were being constructed in new developments. The survey indicated that 60 percent of the developments visited had some form of fireplace with approximately 44 percent being dual-fueled (wood or natural gas), 14 percent constructed or planned to be constructed with dedicated natural gas systems, and approximately one percent being electric fireplaces.

Figure 4 presents a relative comparison of fine particulate emissions from various heating sources.[9]

Figure 4
Relative Emissions from Various Heating Sources



SUMMARY OF PROPOSED RULE

Proposed Rule 445 is included in Appendix A and is summarized below. The text of Proposed Rule 445 included in Appendix A is in strike-out/underline format and reflects changes made to staff's proposal since the January 31, 2007 Public Workshop.

Subdivisions (a) – Purpose; (b) – Applicability; (c) Definitions

These sections describe the purpose of the rule, what parties are subject to rule, and key definitions used throughout the rule.

Subdivision (d) - Requirements

Twelve months after adoption, paragraph (d)(1) of Proposed Rule 445 would prohibit the installation of a wood burning appliance or gaseous-fueled hearth appliance into any new or existing household unless it is a U.S. EPA Phase II-certified wood burning heater (i.e., wood stove and fireplace insert), a pellet-fueled wood stove, a masonry heater, a low emission fireplace, or a dedicated gaseous-fueled fireplace. New U.S. EPA Phase II-certified wood heaters have a certification placard on the back (Figure 5) of the device and the U.S. EPA maintains a list of certified wood heaters on a web site.[10] Paragraph (d)(1) does not prohibit

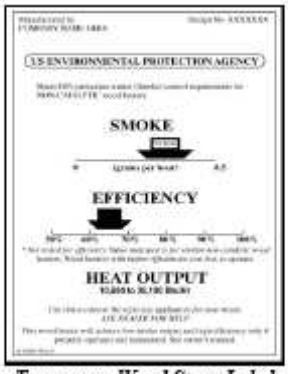
[9] http://www.epa.gov/airprogm/oar/woodstoves/refp.html
[10] http://www.epa.gov/Compliance/resources/publications/monitoring/caa/woodstoves/certifiedwood.pdf

the installation of new pellet stoves and masonry heaters as these appliances are designed to burn very efficiently and do not require U.S. EPA certification.[11]

Paragraph (d)(2) of Proposed Rule 445 prohibits the removal of the operating system for a dedicated gaseous-fueled fireplace installed after the effective date of paragraph (d)(1) except for maintenance activities or system replacement.

Paragraph (d)(3) of Proposed Rule 445 prohibits the sale, transfer, and installation of any used wood burning device that does not meet the performance standards of paragraph (d)(1) unless the unit is rendered permanently inoperable. This provision is solely applicable to the transfer of used wood burning appliances and is not applicable to the sale of an appliance in conjunction with the sale of a property. Examples of wood burning devices that would not be prohibited for sale would include antique or decorative wood stoves that can no longer be used for heating.

Figure 5
U.S. EPA Phase II-Certification Label



Temporary Wood Stove Label

Permanent Wood Stove Label

Proposed Rule 445 paragraph (d)(4) requires that all wood burning appliances must be installed and operated in accordance with the manufacturer's specifications. Proper installation and operation of wood burning appliances is necessary to ensure that heating outputs are maximized while emissions are minimized.

Paragraph (d)(5) of Proposed Rule 445 prohibits the burning of garbage, treated wood, particle board, plastic products, rubber products, waste petroleum, paints, solvents, coatings, any other product not intended by a manufacturer for use as fuel in any wood burning appliance.

Proposed Rule 445 also includes provisions that would require the replacement or removal of older wood heaters (wood stoves and fireplaces inserts) during future property transfers in areas that continue to experience high fine particulate matter concentrations (hot spots) in the future. Specifically, paragraph (d)(6) of Proposed Rule 445 states that no person shall sell or transfer any real property in areas with annual average PM2.5 concentrations above 20 micrograms per cubic meter ($\mu g/m^3$) that contains a wood burning heater unless each wood burning heater is determined to be U.S. EPA Phase II-certified, pellet-fueled, a masonry heater, or rendered inoperable. These provisions are proposed to become effective January 1, 2012 and the proposed rule states that the Executive Officer will provide a definition of those

[11] http://www.epa.gov/woodstoves/basic.html

areas subject to this prohibition at a public hearing before the Governing Board no later than its January 2011 meeting. This provision is designed to serve as a contingency provision that would go into effect in the event there are high PM2.5 areas (hot spots) remaining in the Basin past 2010. However, based on the improvements in PM2.5 air quality experienced Basin-wide during the past several years and continued improvements in the next several years, staff's expectation is that all areas in the Basin will be below 20 $\mu g/m^3$.

Other air district wood smoke control programs include even broader requirements to change-out older, uncertified wood heaters during property transfers. For example, San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) regulation 4901 states that, "No person shall sell or transfer any real property which contains a wood burning heater without first assuring that each wood burning heater included in the real property is U.S. EPA Phase II Certified, a pellet fueled wood burning heater, rendered permanently inoperable, or removed." Similar provisions are contained in regulations governing activities in Washoe County (Reno, Nevada) and the Town of Mammoth Lakes.

Subdivision (e) – Public Awareness Program

Paragraph (e)(1) of Proposed Rule 445 includes requirements for wood burning appliance retailers to provide outreach material that includes information on proper installation, operation and maintenance of a wood burning appliance in accordance with manufacturer specifications as well as information on proper fuel selection and use to buyers at the point of sale. Paragraph (e)(2) also requires wood burning appliance retailers to provide information as prepared by the District at the point of sale on health effects of wood smoke and the voluntary wood burning curtailment program. Paragraph (e)(3) of Proposed Rule 445 requires commercial firewood sellers to provide information as prepared by the District on health effects of wood smoke and the voluntary wood burning curtailment program to customers at the point of sale. District staff will work with affected industries to tailor the District-supplied outreach information to be industry specific. For example, outreach information required to be distributed by commercial firewood sellers may be condensed so that it can be easily included in bundles of wood sold at grocery stores and other retail outlets.

Subdivision (f) – Exemptions

Subparagraph (f)(1) exempts cookstoves from Proposed Rule 445. Generally, cookstoves are defined under Title 40 of the Code of Federal Regulations (CFR) Section 60.531 as a wood-fired appliance that is primarily designed for cooking and has the following characteristics: 1) an oven with an oven rack with a volume of one cubic foot or greater, 2) a device for measuring oven temperature, 3) a flame path that is routed around the oven, 4) a shaker grate, 5) an ash pan, 6) an ash clean-out door beneath the oven, and 7) the absence of a fan or heat channels to dissipate heat from the appliance.

Subparagraph (f)(2) exempts properties that are considered a historic site from the property transfer requirement provisions contained in paragraph (d)(6). This exemption was developed to avoid potential conflicting requirements between AQMD and other agency regulations guidelines and standards relative to preservation of historical buildings that would otherwise lose their significance due to structural or operational characteristics of the predominant styles and character of the neighborhood.

PUBLIC OUTREACH AND COMPLIANCE

An extensive outreach program is planned for Proposed Rule 445 as this is a new source category for the District and because the proposal affects the general public and construction trades instead of industrial sources. Outreach efforts are planned as a two-pronged approach with an education program for the public and an information program for affected industries.

The public education program will include a web site with a summary of the rule requirements, answers to frequently asked questions, links to other web sites (ARB and U.S. EPA), information on the voluntary wood burning curtailment program and the health effects of wood smoke. Additional efforts to increase public awareness of the District wood smoke reduction program may include, but are not limited to, outreach to local governments, interested organizations, and homeowner associations.

The information program for affected industries is intended to help ensure compliance with the rule provisions. Specifically, District staff will notify those affected by the paragraph (d)(1) requirements for new construction and remodels. Anticipated groups targeted for the information program include home builders, local governments, architects, retail outlets, and land developers. District staff also will work with affected industries to ensure compliance with the public awareness requirements contained in subdivision (e) of the proposed rule. Specifically, District staff will work with hearth retailers to ensure that persons purchasing new wood burning appliances are provided with industry-supplied information on proper installation, operation and maintenance of wood burning appliances and proper selection and use of fuels (wood) at the point of sale. Similarly, the District will work with hearth retailers and commercial wood sellers to ensure that the District-prepared information on the voluntary wood burning curtailment program and health effects of wood smoke is provided to customers at the point of sale. Included within the outreach and education program will be simple to understand information on the proper use of seasoned wood (i.e., wood with a moisture content of 20 percent or less). Although moisture content is not a component of the proposed rule it is an important parameter for efficient wood burning. Firewood with too high a moisture content will not burn efficiently and will smolder, resulting in increased emissions and creosote build-up. Seasoned wood (aged for at least six months) will burn hotter, cut fuel consumption and reduce smoke inside and outside the home.

Following a comprehensive outreach program, spot checks could be conducted to ensure that development projects are in compliance with the standards for new construction and that hearth retailers and wood sellers are providing the appropriate outreach material to customers at the point of sale.

The Proposed Rule 445 paragraph (d)(6) provision that would require the change-out of older wood heaters during future property transfers in remaining areas with high fine particulate matter concentrations represents a relatively new compliance activity for the District because it entails interaction with individual homeowners during property transactions. A review of other California air districts that have similar rule provisions shows that requirements have been as minimal as a one page notification from the seller supplied to the District indicating that the property is in compliance with the rule provisions (San Joaquin Valley) to a mandatory site inspection with a compliance report prepared and submitted to the agency (Town of Mammoth Lake, Great Basin Unified Air Pollution Control District). As indicated previously, based on past as well as anticipated future improvements in PM2.5 air quality, it is likely that this provision will never be triggered. In the event that it is triggered, however, the current approach favored to implement these requirements would be for an entity involved in the real estate transaction process (broker, escrow company, home inspector) to

submit a simple notification to District during the escrow process indicating that the property is in compliance with the proposed requirements or how the seller altered the property (remove or render inoperable the non-compliant appliance, appliance replacement with compliant device, etc.) to demonstrate compliance with the requirements. Staff is open to consider other implementation approaches as well. Prior to initiating the program, further consultation with entities affected would be conducted to ensure that the program's goals would be achieved without significant disruption to the property transfer process.

IMPLEMENTATION OF WOOD BURNING CURTAILMENT PROGRAM

Voluntary and mandatory wood burning curtailment programs have been implemented in other regions for years. The following is a summary of some of these programs. Following the summary is the suggested program for implementation of the Proposed Rule 445 voluntary wood burning curtailment program.

San Joaquin Valley

The San Joaquin Valley Unified Air Pollution Control District (Valley Air District) adopted amendments to Rule 4901 in July of 2003. The Rule includes a mandatory wood burning curtailment provision (special circumstance exemptions provided) whenever Air Quality Index (AQI) values are greater than 150. The program is operational during November through February each year and forecasts are made daily for three geographic sub regions, separated by county lines. The program also specifies that wood burning is discouraged when the AQI is greater than 100. The public is notified of the forecast system through the Valley Air District web site, a telephone number with a recorded message and information is made available to media outlets. To improve public understanding, the web site wood burning forecasts are made with icons resembling street signs.

Bay Area Air Quality Management District

Although there is not a Bay Area Air Quality Management District (BAAQMD) wood burning regulation, the air district did develop a model ordinance in 1998 for adoption by local governments and has instituted a Spare the Air Tonight program. The model ordinance specifies that it is unlawful to use a wood burning appliance whenever the BAAQMD issues a "Spare the Air" forecast. In some cases local governments have implemented this program

through voluntary curtailments (7 jurisdictions) and in other cases the curtailments are mandatory (10 jurisdictions).

The wintertime "Spare the Air" program is in effect from November through February of each year. The BAAQMD web site includes the following background information on the wintertime Spare the Air program. "Particulate matter - especially particulate matter 2.5 microns or smaller in size (PM2.5) - can become a problem in the Bay Area. Spare the Air Tonight advisories are issued on nights when PM2.5 concentrations are expected to be unhealthy. On these nights, they ask residents not to drive and not to use their fireplaces and wood stoves. Wood burning produces about one-third of the particulate pollution on a typical winter night."

Town of Mammoth Lakes

The Great Basin Unified Air Pollution Control District (GBUAPCD) adopted Rule 431 (Particulate Emissions – Town of Mammoth Lakes) in 1990 and amended the regulation in 1991. Under the Rule, a mandatory wood burning curtailment is issued when PM10 levels exceed 130 $\mu g/m^3$ or when adverse meteorological conditions are predicted to persist. The rule also specifies that if it is determined that the threshold for forecasting a mandatory curtailment is not sufficient for the area to attain the National Ambient Air Quality Standards, it may be lowered by resolution by the Town Council of the Town of Mammoth Lakes. If a "no burn" day is called by the Town of Mammoth Lakes, the local radio and television stations are notified and all solid fuel burning (excluding only pellet stoves) is required to cease. Wood burning curtailment information is also available to the public through a recorded phone message.

Implementation of District Voluntary Wood Burning Curtailment Program

Proposed Rule 445 does not specifically establish a wood burning curtailment program. However, because the regulation of wood burning devices represents a new source for the District and due to concerns over the enforceability of a mandatory wood burning curtailment program, a voluntary curtailment program will be developed in conjunction with Proposed Rule 445 implementation. Under the program, the AQI will be used in conjunction with meteorological conditions to forecast when a voluntary wood burning curtailment announcement will be made. The AQI values will be based on the pollutant (PM10, PM2.5, ozone, carbon monoxide, nitrogen dioxide) with the highest forecast values for the following day. It is acknowledged that efforts to reduce wood smoke emissions are primarily targeting PM2.5 reductions; however, wood burning does increase NOx emissions which contribute to increased ozone and the formation of secondary particulate matter. Currently, an AQI over 100 is considered to be one of the triggers for forecasting a voluntary wood burning curtailment day. The voluntary wood burning curtailment forecasting program will be conducted year-round. Based on a review of previous year's data, it is anticipated that there would be approximately 80 to 100 of these days forecast each year. One voluntary wood burning curtailment forecast will be issued for the South Coast Air Basin as a whole recognizing the fact that emissions from coastal areas influence air quality in the inland area and the reverse can be true based on meteorological conditions. Due to existence of hot spots, efforts may be made to create sub regional forecasts in the future.

During the voluntary curtailment period, the public would be asked to voluntarily stop using a wood burning appliance and to use cleaner technologies or other alternatives as suggested by the Executive Officer. Anyone wishing to access information for the voluntary wood

burning curtailment program will be able to obtain the forecast via the District's web site or through a toll free number (800) CUT-SMOG [288-7664]. Efforts to expand this notification process through a list-serve e-mail, media weather forecasts and Public Service Announcements will be considered in the future.

EMISSIONS INVENTORY

Emissions from residential wood burning devices are caused primarily by incomplete combustion and include PM, CO, NOx, SOx, and VOC, although particulate emissions have been the focus of air district control programs. Studies have shown that these emissions are generally in the accumulation ($\leq$ 2.5 microns) size range (Jacob, et.al., 2000). Additionally, incomplete combustion of wood produces polycyclic organic matter, a group of compounds classified as hazardous air pollutants under Title III of the federal Clean Air Act.

Existing Emissions Inventory

Table 1 presents year 2002 annual average emissions from wood stoves and fireplaces in the District (ARB, CEIDARS, 2006). All emissions are reported in terms of tons per annual average day. ARB data also estimates the 2002 PM2.5 wood stove and fireplace emissions inventory at 10.6 tons PM2.5 per winter day.[12]

Table 1
2002 Annual Average Emissions from Residential Wood Combustion (tons/day)

CES/EIC Codes	Equipment Description	VOC	CO	PM	PM10	PM2.5
610-600-0230-0000	Wood Combustion - Wood Stoves	1.05	14.34	2.40	2.25	2.17
610-602-0230-0000	Wood Combustion – Fireplaces	1.6	29.78	4.08	3.81	3.67
	TOTAL	2.65	44.12	6.48	6.06	5.84

The ARB emissions inventory was developed based on estimated number of wood-burning units and amount of wood burned per household by county multiplied by the U.S. EPA's AP-42 emission factors. AQMD staff, in cooperation with ARB and other stakeholders, has been reevaluating the emissions inventory in conjunction with current rule development efforts.

Updated Emissions Inventory

Air pollution emissions from wood burning, in simple terms, are determined by the number of sources, multiplied by amount of fuel per source, multiplied by an emission factor. Emissions from wood burning appliances are highly variable, depending on the amount and type of wood burned and the types of appliances being used for burning wood. Installation and wood burning practices also influence emissions. In order to estimate emissions from this source category, many assumptions are required to be made with the realization that any

[12] www.arb.ca.gov/app/emsinv/ccos/fcemssumcat_cc212.php

variations in one or more of these variables will substantially change the calculations. With the support of the Hearth, Patio, and Barbeque Association (HBPA), a revised wood burning appliance emission inventory (referred to as the OMNI report) was developed for both the Basin and the Coachella Valley portion of the Salton Sea Air Basin (OMNI Environmental, 2006).

Assumptions used to update the inventory were based, to the extent feasible, on local data and are included in Appendix B. For example, the American Housing Survey (AHS), conducted by the U.S. Census Department, compiles data on the number and type of wood burning appliances for Los Angeles, Santa Ana, and Riverside/San Bernardino areas based on statistical sampling within each area. The information in Table 2 presents a summary of 2002 AHS data, or interpolated data, for the Basin that includes the estimated number of households with useable fireplaces, households (separated by appliance type) using wood for primary heat, and households (separated by appliance type) using wood burning as a supplemental heating source. As illustrated in Table 2, there are many households with useable fireplaces but a very small portion (less than one percent) are used as a primary heat source. Households with a usable fireplace not used as main or other heating equipment are considered to use the fireplace for aesthetic purposes. AHS data is not additive as respondents could indicate that a stove or a fireplace is considered "main heating equipment" and "other heating equipment".

Table 2
American Housing Survey Information

		Main Heating Equipment			Other Heating Equipment[1]		
Metropolitan Area	Useable Fireplace	Stove	Fireplace with Insert	Fireplace (no insert)	Stove	Fireplace with Insert	Fireplace (no insert)
Los Angeles-Long Beach	1,121,450	925	5,850	2,275	17,525	71,750	174,225
Anaheim-Santa Ana	531,600	<50	<50	800	2,400	32,100	54,100
Riverside-San Bernardino	573,800	6,500	1,800	3,700	18,200	65,300	84,400
Total	2,226,850	7,475	7,700	6,775	38,125	169,150	312,725

[1] Supplemental heating source

With information from the AHS report as a first start, the OMNI report used assumptions based on regional and national surveys to estimate the number of wood burning appliances within various wood burning appliance categories (Table 3).

Wood burned by appliance type was then estimated and the mass of wood was multiplied by the appropriate emission factor to estimate annual average emissions. Table 4 presents the annual average daily emissions estimate for wood burning appliances included in the OMNI report.

Table 3
Estimates of Appliances by Appliance Type

	South Coast Air Basin		Coachella Valley	
Appliance Type	Number Owned	Number Used	Number Owned	Number Used
Conventional pre-EPA certification wood heaters	161,260	148,008	7,425	6,702
U.S.EPA-certified non-catalytic wood heaters	34,341	33,107	1,590	1,499
U.S. EPA certified catalytic wood heaters	14,134	13,632	649	615
Pellet Heaters	9,490	9,278	497	479
Fireplaces without inserts	1,673,684	1,221,721	45,530	33,237
Total	1,892,909	1,426,746	55,691	42,532

Table 4
2002 PM2.5 Emissions Inventory for Basin and Coachella Valley

PM2.5 (tons/day)

Appliance Type	**Basin**	**Coachella Valley**
Conventional pre-EPA certification wood heaters	9.07	0.43
U.S. EPA certified non-catalytic wood heaters	0.65	0.03
U.S. EPA certified catalytic wood heaters	0.32	0.02
Pellet heaters	0.03	<0.01
Fireplaces without inserts (wax/fiber logs included)	9.85	0.19
Total	19.92	0.68

With the high number of households with usable fireplaces in southern California, a key component used to estimate emissions is the average wood consumption per unit. The California Air Resources Board (ARB) includes a default statewide wood burning estimate of 0.28 cords per household and an estimate that a cord of wood weighs approximately two tons (ARB, 1997). For reference, a cord of wood is measured by volume as four feet wide by four in height, by eight feet in length. A review of wood seller survey information indicates that the average weight of a cord of wood in southern California is approximately 3,081 pounds or 1,400 kilograms (Sierra Research, 1989). Emission inventory guidance encourages the use of local survey data when available.

Using the average weight of a cord of wood in southern California and data from available survey information, the OMNI report estimated that wood burning heaters used for heat burned an average of 0.95 to 1 cord (approximately 3,000 pounds) per year. For fireplaces without inserts two independent methods were developed by OMNI to estimate the amount of

wood burned for heating and wood burned for aesthetic use. One method estimated the number and duration of fires and the other included a weighted average to estimate cords burned per year for relative heating and aesthetic use. The first method (based on number and duration of fires) estimated typical annual wood usage per household for relative heating and aesthetics at 0.22 cord or approximately 678 pounds. The second method (weighted average) was based on estimates of the average cords burned in fireplaces without inserts for heating (0.656 cords or approximately 2,000 pounds) and average cords burned for aesthetics (0.069 cords or approximately 213 pounds).[13] This resulted in an estimate that the average cords burned per household per year, weighted for relative heating and aesthetic use, was 0.17 cords (523 pounds).

In order to provide a range of emissions estimates, variations to the wood burned per household assumptions were applied to the base information included in the OMNI report. Specifically, the amount of wood burned in wood burning heaters used for primary heating was reduced from approximately 3,000 to 2,000 pounds based on data from the referenced report.[10] Similarly, the amount of wood burned for relative heating and aesthetics was reduced from 0.22 cords or approximately 678 pounds to 0.069 cords or approximately 213 pounds from the referenced report.[10] Applying these average wood burning estimates to the number of wood burning appliances developed in the OMNI report results in the adjusted emission inventory presented in Table 5. It should be noted that the adjusted emission inventory presented in Table 5 does not alter the emission estimates for pellet stoves or wax/fiber logs where it is believed that better data was available.

Table 5
Adjusted 2002 PM2.5 Emissions Inventory for Basin and Coachella Valley to Account for Lower Wood Burning Estimates

	PM2.5 (tons/day)	
Appliance Type	**Basin**	**Coachella Valley**
Conventional pre-EPA certification wood heaters	6.26	0.30
U.S. EPA certified non-catalytic wood heaters	0.45	0.02
U.S. EPA certified catalytic wood heaters	0.22	0.01
Pellet heaters	0.03	<0.01
Fireplaces without inserts (wax/fiber logs included)	3.13	0.08
Total	10.1	0.41

Reducing the estimate of the average amount of wood burned per household for primary heating, relative heating, and aesthetic use, especially for the southern California area, appears appropriate and is consistent with available survey information indicating that households tend to overestimate when asked about the amount of wood burned each year (Sierra Research, 1989).

[13] Houck J.E., et al, A Recommended Procedure for Compiling Emission Inventory for National, Regional, and County Activity Data for the Residential Wood Combustion Source Category, proceedings U.S. Environmental Protection Agency Emission Inventory Conference, Denver, CO, 2001

Based on this information, the annual average daily emissions from wood burning appliances is estimated to range from approximately 10 to 20 tons per annual average day for the Basin and 0.41 to 0.68 ton per annual average day for the Coachella Valley portion of the Salton Sea Air Basin. It is acknowledged that the total annual wood burning emissions will increase during periods of cooler weather (generally November through February). For example, applying the total annual average wood burning emissions estimate of ten tons per day to the winter months identified above would result in an estimate of approximately 30 tons of PM2.5 per winter day.

EMISSIONS REDUCTIONS

The paragraph (d)(1) prohibition of the installation of traditional, uncontrolled fireplaces in new developments, remodels, or permanent outdoor installations is a large source of emissions reductions from Proposed Rule 445. Emission reductions can be estimated as the differential in emissions from an uncontrolled fireplace to a combination of permissible appliances under the Proposed Rule 445 provisions. It is anticipated that, due to buyer preference for convenience, the majority of fireplaces installed in new home construction are dedicated natural gas units; however, traditional, uncontrolled fireplaces are still currently permitted to be installed in new homes, remodels, and outdoor applications.

To estimate Proposed Rule 445 emissions reductions potential, Construction Industry Research Bureau (CIRB) data was used to determine the annual average number of housing units constructed in the District (Appendix C). The number of housing units with fireplaces was then determined based on an ARB assumption that 40 percent of households have fireplaces. (This ARB assumption was corroborated by comparing 2002 AHS data for District households with usable fireplaces with the total number of District households based on 2002 U.S. Census data). An assumption that 75 percent of new households constructed have dedicated natural gas fireplaces was then used to estimate the number of traditional, uncontrolled fireplaces that would have been installed in new homes in absence of Proposed Rule 445. It was then presumed that instead of installing traditional, uncontrolled fireplaces in new home construction, a mix of U.S. EPA Phase II-certified units, dedicated natural gas units, and electric units would be installed to comply with the regulation. The resulting emissions reductions from Proposed Rule 445 paragraph (d)(1) provisions are estimated at approximately 25 tons of PM2.5 per year beginning in 2008. It should be noted that Proposed Rule 445 will also result in cumulative air quality benefits as annual emissions reductions will be recurring. Therefore, Proposed Rule 445 paragraph (d)(1) emissions reductions can be estimated at approximately 175 tons of PM2.5 per year by 2014.

Additional emission reductions would be associated with the paragraph (d)(6) requirements to replace, remove, or render inoperable all non-EPA Phase II-certified wood heaters upon the sale of real property in areas impacted by PM2.5 levels above 20 $\mu g/m^3$. Due to uncertainties in the size of the area that may become subject to these requirements in 2011 it is believed that attempts to quantify this requirement would be speculative. Available information on individual homeowner costs to implement this requirement is, however, presented in the following section.

Appendix C includes the worksheets for the emission reduction estimates. Efforts will continue to be made through the public process to further refine the estimated number of traditional, uncontrolled fireplaces currently being installed in new housing developments.

COST-EFFECTIVENESS

Cost-effectiveness is calculated by dividing the estimated compliance costs of a proposed regulation by the estimated emission reductions. Proposed Rule 445 compliance costs were based on assumptions regarding incremental increase in costs for new residential construction provided by product vendors and replacement costs for commercial facilities. Maintenance costs were presumed to be zero as the traditional, uncontrolled fireplaces that would have been installed in absence of the regulation would be subject to equivalent maintenance costs as the appliances installed to comply with Proposed Rule 445. These costs were divided by the estimated emission reductions for 20 years (estimated equipment lifetime) in order to obtain a cost-effectiveness estimate using the Discounted Cash Flow (DCF) methodology. The DCF methodology is based on the following formula:

$$\frac{K + OEM\ (PVF)}{\text{Emission Reductions} \times 20\ \text{years}}$$[14]

Where:

K – capital costs
O&M – recurring (maintenance) costs
PVF – present value factor (12.5)

Based on the information presented in Appendix C, a cost-effectiveness estimate of the Proposed Rule (d)(1) new construction requirements is approximately $9,000 per ton of PM2.5 reduced.

Because emissions reductions have not been estimated for the property transfer requirements, it is not possible to calculate cost-effectiveness for these provisions. However, replacement of an existing uncertified freestanding wood stove with an U.S. EPA Phase II-certified wood stove have been estimated to range from approximately $3,400 to $4,150 and costs for replacement of an existing uncertified freestanding cordwood stove with a freestanding gas stove has been estimated at approximately at approximately $3,400 (Houck, 2006). Cost estimates for replacing non-U.S. EPA Phase II certified fireplace inserts are similar. It is also acknowledged that depending on the mechanism selected to implement the property transfer requirements there would be additional costs incurred by persons in the real estate services sector (i.e., brokers, escrow agents, home inspectors, etc.).

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA) and AQMD Rule 110, Pursuant to the California Environmental Quality Act (CEQA) and AQMD Rule 110, an Environmental Assessment (EA) for PR 445 has been prepared (SCAQMD No. 090207JK, February 2007). The purpose of the EA is to describe the proposed project and to identify, analyze, and evaluate any potentially significant adverse environmental impacts that may result from adopting and implementing the proposed Rule 445.

No significant adverse impacts were identified for any environmental topic in the Draft EA. The Draft EA has been circulated to the public for a 30-day review and comment period from

[14] Estimated equipment lifetime

February 9, 2007 to March 13, 2007. Comment letters received during the public review and comment period will be addressed and included in the Final EA.

SOCIOECONOMIC ASSESSMENT

A socioeconomic assessment has been prepared and will be available as part of the Set Hearing Board package.

DRAFT FINDINGS

Health and Safety Code Section 40727 requires the AQMD to adopt written findings of necessity, authority, clarity, consistency, non-duplication and reference.

Necessity
A need exists to adopt Rule 445 to implement 2003 AQMP control measure MSC-06 and draft 2007 AQMP control measure BCM-03 in order to assist in the attainment of State and federal PM standards for the South Coast jurisdiction.

Authority
The AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from California Health & Safety Code Sections 39002, 40000, 40001, 40702, and 40725 through 40728, inclusive.

Clarity
The proposed amended rule has been written or displayed so that its meaning can be easily understood by persons directly affected by it.

Consistency
The proposed amended rule is in harmony with and not in conflict with or contrary to, existing statues, court decisions or state or federal regulations.

Non-Duplication
The proposed amended rule does not impose the same requirements as any state or federal regulations. The amendment is necessary and proper to execute the powers and duties granted to, and imposed upon, AQMD.

Reference
By adopting the Proposed Rule, the AQMD Governing Board will be implementing, interpreting, and making specific the provisions of the California Health & Safety Code Section 40001 (rules to achieve ambient air quality standards).

Alternative Control Measures - Health and Safety Code Section 40440.5, subsection (c)(3) requires an analysis of alternative control measures. One alternative is to not adopt the proposed rule, however, the emission reductions are necessary as part of the AQMD's proposal to meet State and federal air quality standards. Another alternative would be to establish density restrictions that would allow the installation of a limited number of traditional, uncontrolled fireplaces in rural areas. The traditional, uncontrolled fireplaces produce more emissions and burn more wood when compared with the wood burning appliances allowed under Proposed Rule 445. This would reduce the emission reduction

benefits of the proposed rule. An additional alternative would be to establish density restrictions for all wood burning appliances. As will be noted in the proposed adoption resolution, District staff intends to commit to further analyze additional strategies to reduce PM2.5 emissions from wood burning appliances based on efforts to meet federal PM2.5 standards. Establishing density restrictions that would limit the number of wood burning appliances in neighborhoods with higher densities and an expansion of the paragraph (d)(8) property transfer requirements to a larger area will be included as part of that effort.

Draft Comparative Analysis

Health and Safety Code §§40727.2 requires a written analysis comparing the proposed rule with existing federal, State and District regulations. Health and Safety Code §§40727.2, subsection (c) and (d) further require the analysis to review averaging provisions, operating parameters, work practice requirements, and monitoring, reporting and recordkeeping requirements associated with existing applicable rules and proposed regulations.

As mentioned, the U.S. EPA has previously adopted performance standards for new wood heaters (wood stoves and fireplace inserts) sold since 1992.[15] Proposed Rule 445 is consistent with these requirements as wood burning units that meet the U.S. EPA performance standards would be allowed to be installed and operated in new homes and remodels. Proposed Rule 445 is also complementary to the federal program as it also prohibits the sale of used wood burning heaters that do not meet U.S. EPA performance standards. Table 6 below identifies other State and AQMD rules that apply to the sources subject to Proposed Rule 445. Footnotes explain the differences between Proposed Rule 445 and the other State and AQMD Rules where relevant.

[15] 4.1 grams PM per hour for catalytic heaters and 7.5 grams per hour for non-catalytic heaters

Table 6
Comparison of Proposed Rule 445 and other AQMD Rules

Rule	Source	Emission Reductions / Limits (footnotes provide comparison with Proposed Rule 445 requirements)	Averaging Procedures (Units), Work Practices, Operating Provisions	Monitoring, Recordkeeping, Reporting, Test Methods
State H & S Code 41701	Applicable to any source.	Prohibits discharge of excessive visible emissions.[16]	40 percent opacity can not be exceeded three minutes in any hour, cumulatively.	Test methods - based on opacity as determined by Ringlemann chart or U.S. EPA Method 9.
AQMD 401 (Visible Emissions)	Any single source of emissions; would include exhaust stack emissions.	Prohibits excess visible emissions.[17]	20 percent opacity can not be exceeded three minutes in any hour, cumulatively.	Test methods -based on opacity as determined by Ringlemann chart or U.S. EPA Method 9.
AQMD 402 (Nuisance)	Any source	Prohibits public nuisance caused by emissions of air contaminants.[18]	None	None specified.
AQMD 404 (Particulate Matter – Concentration)	Applicable to any source	Prohibits discharge of particulate matter in excess of certain rates.[19]	Based on grains per cubic foot of air stream.	None specified.
AQMD 405 (Solid Particulate Matter – Weight)	Applies to any source	Prohibits discharge of particulate matter weight in excess of specified rates.[20]	Establishes maximum discharge rate (lbs./hr.) based on process weight per hour.	None specified.

[16] Health and Safety Code § 41701 provisions are implemented primarily in response to public complaints. Proposed Rule 445 requirements are applicable regardless of whether public complaints are filed.
[17] Rule 401 requirements are based in response to public complaints and visual observations. Proposed Rule 445 requirements are applicable regardless of whether public complaints are filed.
[18] Rule 402 provisions are implemented primarily in response to public complaints. Proposed Rule 445 requirements are applicable regardless of whether public complaints are filed.
[19] This Rule is used in conjunction with the AQMD's permitting system for point sources of air pollution. Wood burning sources are not subject to AQMD permits.
[20] Under Rule 405, point source emissions are addressed through the permit evaluation process. Proposed Rule 445 sources are not subject to the AQMD's permitting system.

PUBLIC OUTREACH

A Working Group comprised of representatives of affected industries/agencies, environmental organizations and interested persons, was convened in July of 2006 to discuss key aspects of a potential wood smoke control program. Subsequent meetings were held in January and February of 2007. During the Working Group meetings, AQMD staff presented information and solicited suggestions on Proposed Rule 445. AQMD staff also met individually with representatives from the Southern California/Building Industry Association (SC/BIA) and the Southern California Realtors Association in July of 2006. Staff also met individually with hearth product manufacturers and fuel suppliers. Additionally, AQMD staff conducted site visits to Hearth, Patio, and Barbeque Association (HBPA) member facilities and attended HBPA trade shows held in 2005, 2006, and 2007.

PUBLIC COMMENTS AND RESPONSES

A Proposed Rule 445 public workshop was conducted on January 31, 2007. In addition to the oral comments at the meeting, staff received written comment letters specific to Proposed Rule 445 during a comment period that ended February 21, 2007. Many of the comments on the Proposed Rule or the preliminary draft staff report concerned issues brought up by more than one comment letter. The following are general responses to these comments. Following these general responses is a summary of individual oral and written comments, followed by staff responses.

General Comments and Responses

GR-1 Add dedicated gas log fireplaces as an exempt gaseous-fueled appliance

Staff Response: Staff agrees. Based on comments received at the public workshop, AQMD staff has agreed to expand the definition of gaseous-fueled residential hearth appliance to include any dedicated gaseous-fueled fireplace where the operating system is "…installed such that the burner pan and associated equipment are affixed to the masonry or metal base of the fireplace." To improve clarity, a dedicated gaseous-fueled fireplace has also been added to the acceptable options for new construction. A companion requirement has been added to the proposed rule [paragraph (d)(2)] that would prohibit the removal of an operating system of a gaseous-fueled fireplace once installed except for maintenance and system replacement.

GR-2 Extend the effective date for phasing in the requirements for new construction to at least 12 months.

Staff Response: Staff agrees. Establishing a rule effective date of six months after rule adoption was intended to implement the voluntary wood burning curtailment program, prior to next year's typical residential wood burning season (generally November through February). Based on the comments received, staff is proposing to implement the voluntary wood burning curtailment program six months after rule adoption; however, implementation of the standards for new construction will now be proposed for 12 months after rule adoption.

This will allow additional time for builders to complete already initiated projects and AQMD staff to conduct the necessary outreach to home builders, architects, local governments, etc.

GR-3: Do not limit the number of U.S. EPA Phase II-certified wood burning appliances in new homes. Few homeowners would operate more than one wood burning appliance at a time; thus, this requirement has no potential for improving air quality.

Staff Response: Staff has deleted the provision. Except in higher altitudes (>6,000 feet above mean sea level) and where wood combustion is the sole source of heat, it is unlikely that more than one unit would be used simultaneously.

GR-4: The no-burn provisions are the largest single source of emissions reductions for Proposed Rule 445. Would it be possible to place this requirement at the start of the regulation to emphasize its importance as an emissions reduction measure? What is the cost-effectiveness of the no burn provisions as a stand alone requirement?

Staff Response: Regulation of wood burning is a new source category for the District that affects the general public instead of more traditional, industrial sources. There are also concerns over the enforceability of a mandatory wood burning curtailment program. Accordingly, the previous mandatory wood burning curtailment program has been removed from the proposed rule. The voluntary wood burning curtailment program will instead be implemented through the Proposed Rule 445 comprehensive outreach and education program. Cost-effectiveness for a voluntary wood burning curtailment is expected to be extremely favorable because implementation costs are minimal and the reduction benefits can be quite significant but it is difficult to fully quantify it because of the voluntary nature of the program. The cost-effectiveness of new construction standards is estimated to be approximately $9,000 per ton reduced.

GR-5: Focus on implementation of the proposed no burn program and allow this program three years to operate before implementing any of the additional best technology controls proposed in the rule. If wood burning curtailment emissions reductions are not enough relative to achieving the state and federal particulate standards, the limitation on new construction in those areas above 20 µg/m^3 could be contemplated, similar to that of the property sales/transfer requirements.

Staff Response: Staff disagrees. While the voluntary wood burning curtailment program and public awareness provisions are important elements of the rule and its implementation, the requirements for the use of the most efficient wood burning appliances in future construction are also very important. The technology is available and on the market. The Basin is in non-attainment for both the state and federal annual average and 24-hour PM2.5 standards and the best preventive measures must be employed. In addition, PM2.5 is a criteria pollutant with the most adverse health effects and the South Coast Air Basin has a disproportionate exposure to air pollution, in particular fine particulate matter < 2.5 microns. If unrestricted in the future, new construction would add to the already significant PM2.5 levels. This provision in the proposed rule would seek to limit this exposure by reducing emissions from fireplaces in new construction by approximately 25 tons per year and this will be additive in each subsequent year.

GR-6: Design a better method for phase-out of uncontrolled wood heaters in PM2.5 hot spot areas. The proposed change-out requirements contained in paragraph (d)(8) places an undue burden on realtors, code-enforcement staff, and building inspectors.

Staff Response: Staff disagrees. It should be emphasized that this provision is designed to serve as a contingency provision that would go into effect after a Governing Board public hearing in 2011 in the event there are areas with high PM2.5 exposure (hot spots) levels (above 20 $\mu g/m^3$) still left in the Basin past 2010. Based on the PM2.5 air quality improvements experienced in the last four to five years and improvements anticipated in the next several years, it is unlikely there will be any hot spot areas left in the Basin past 2010. Therefore, even under a worse-case scenario there will be very few local jurisdictions that may be impacted by this provision. Consequently, it is not unreasonable to anticipate that this provision would be implemented by realtors, inspectors, and code enforcement staff in the same manner as other requirements for transfer of ownership or sale of real property. Earthquake safety and lead paint disclosures, for example, are already done in this fashion and there are other disclosure documents as well. Although the implementation mechanism has yet to be fully developed, it is envisioned that the requirements would be implemented in a manner similar to that of the San Joaquin Valley UAPCD through submission of one of the many escrow disclosure documents. This is not seen as something new for these affected groups to do; rather it is an incremental element to be added to an already existing list of mandated items to be checked during the change of property ownership. District staff intends to pursue funding to implement voluntary change-out programs in an effort to further minimize the implementation impacts of this provision and is also open to other implementation suggestions.

GR-7: The rule states that wood sold as seasoned must be less than twenty percent moisture content. Individual home owners are not going to have moisture meters. Is there a better way to distinguish dry wood that would be more useful to home owners (such as length of time since wood was cut)?

Staff Response: Yes. As specified in the staff report, a general rule-of-thumb for consumers is that wood may be considered seasoned after 6 to 12-months of drying, however site-specific conditions may vary. Dry seasoned wood is relatively easy for buyers to distinguish from green, unseasoned wood and tips will be provided to the public as part of the outreach materials to be developed in conjunction with paragraph (d)(3) of this rule.

GR-8: Proposed Rule 445 paragraph (d)(1) should be modified to allow the use of next generation compliant wood burning fireplaces.

Staff Response: Staff agrees. Subparagraph (d)(1)(D) of the proposed rule contained in the preliminary draft staff report specified that a wood burning fireplace could be installed in new construction provided that the appliance met the U.S. EPA Phase II certification standards for wood stoves and fireplace inserts. Comments subsequently received indicated that efforts to develop a low emission fireplace would not follow the guidance contained in the U.S. EPA's Phase II certification program. Specifically, the low emission fireplace standards would be based on emissions per weight of fuel instead of the emissions per hour currently used by the U.S. EPA Phase II certification program and there are also differences between averaging times between the two programs. The current version of the proposed rule would allow the installation of a low emission fireplace in new construction. A low emission fireplace is

defined as a fireplace that meets the criteria established by the U.S. EPA as part of the voluntary low emission fireplace program.

Individual Comments and Responses

A. Emissions Tradeoffs

Comment 1: The proposed rule could result in an increase of green house gas emissions by providing incentives for the increased use of fossil fuels (e.g., natural gas).

Staff response: Based on a study by Sacramento Metropolitan AQMD, wood combustion has higher green house gas emissions than natural gas, based on an equivalent burn duration. According to the staff report for the adoption of that agency's wood burning appliance rule, use of traditional fireplaces emit 2.3 times more CO_2 than natural gas on a useful heat basis. Therefore, based on these estimates, implementation of Proposed Rule 445 will result in a net reduction of greenhouse gases.

B. Title 24

Comment 2: The State of California Title 24 building energy efficiency standards may be an avenue to assist with implementation of the paragraph (d)(1) standards for new construction.

Staff Response: Staff agrees. Based on a review of the 2005 residential compliance manual for the Title 24 there are presently mandatory requirements intended to limit infiltration associated with fireplaces, decorative gas appliances, and gas logs. According to the manual, fireplace efficiency can also be greatly improved through proper air control and reduced infiltration is also a benefit when the fireplace is not in use. Staff believes that the Proposed Rule 445 requirements are consistent with the Title 24 requirements as efforts to improve household heating efficiency will result in reduced air pollutant emissions. Staff will explore working with staff from the California Energy Commission to ensure that Proposed Rule 445 standards for new construction are implemented in the District.

C. Property Transfer, Paragraph (d)(6) Requirements

Comment 3: Where did the 20 $\mu g/m^3$ threshold for areas that would be subject to the paragraph (d)(8) requirements in 2012 come from; it seems arbitrary and not health protective. It seems that the lower threshold based on the federal annual average PM2.5 standard of 15 $\mu g/m^3$ by 2015 should be used.

Staff Response: Paragraph (d)(6) is designed to serve as a contingency provision that will go into effect in the event there are areas with high PM2.5 exposure (hot spots) levels (above 20 $\mu g/m^3$) still left in the Basin after 2010. By focusing efforts to replace non-compliant wood heaters during property transfers in the area with the highest levels of air pollution, the District will maximize efforts to attain the PM2.5 standards by 2015. The paragraph (d)(6) property transfer requirements are scheduled to become effective in 2012 to further ensure that the necessary emission reduction measures can be put in place prior to the 2015 compliance date. Thus, as a preventive measure, the level of 20 $\mu g/m^3$ will be triggered in 2012, three years in advance of the year 2015 compliance date for achieving a PM2.5 level of 15 $\mu g/m^3$.

Comment 4: Is it correct that the year 2012 change-out requirements contained in paragraph (d)(6) are only applicable to wood heaters and not traditional open hearth fireplaces?

Staff Response: Yes.

Comment 5: A disproportionate amount of wood smoke is generated by a small number of households with non-U.S. EPA Phase II-certified conventional wood stoves or fireplace inserts, but the bulk of the total emissions come from the large number of lightly used open fireplaces. For this reason, the real-estate change-out provisions that may be triggered in the Inland Empire in 2012 are strongly supported. The effect of this rule would be that only EPA certified inserts would be listed as "features" for real-estate listings for existing homes. This will be a burden to realtors, but based on the understanding of the proposed area, the proposal would affect 5 percent of home sales in that small area. Much broader property transfer requirements have existed in other jurisdictions for almost 20 years (e.g., Reno, Nevada). It is agreed that it would be most desirable that the property transfer requirements contained in paragraph (d)(6) would not be needed or needed only in a small area, but it is important to include this provision as a legitimate possibility.

Staff Response: Staff agrees. Thank you for the comment.

Comment 6: The estimated number of potentially affected properties under the proposed paragraph (d)(6) property transfer requirements (27,414) is overstated. If the number of potentially affected properties is overstated and the estimated emissions reductions are currently low, then the cost-effectiveness estimates would be much higher. Also, the costs for replacement of a non-EPA Phase II-certified insert are underestimated as they do not include costs to persons in the real estate service sector that would be assigned responsibility for ensuring compliance with these provisions. The group I represent would like to work with the District to better define the number of households potentially affected by the property transfer requirements in Proposed Rule 445 based on parameters such as age of household.

Staff Response: Proposed Rule 445 includes a property transfer requirement for non-U.S. EPA Phase II-certified wood heaters located in areas with annual average PM2.5 levels greater than 20 $\mu g/m^3$ to be replaced or rendered inoperable. Based on current PM2.5 levels, this area (above 20 $\mu g/m^3$) incorporates the metropolitan Riverside/San Bernardino area. Although PM2.5 levels are predicted to decrease and, thus, shrink the size of this area, the preliminary draft staff report included a conservative estimate that the entire Riverside/San Bernardino County portion of the Basin could be subject to the property transfer requirements. The estimated number of non-U.S. EPA Phase II-certified wood heaters located in this area was based on the total number of non-U.S. EPA Phase II-certified wood heaters estimated for the Basin multiplied by the percentage of households in the Riverside/San Bernardino portion of the Basin. The emissions reductions were then estimated by an assumption that a subset of households in this area would be subject to property transfer each year. Non-compliant wood burning heater replacement cost information has been provided and a statement has been added that persons in the real estate service sector would also incur costs for implementation of this portion of the proposed rule. The District is very interested in further refining the number of potentially affected non-compliant wood burning heaters through any reliable source of data.

Comment 7: Instead of requiring the real estate service sector to implement the property transfer requirements on behalf of the District, it appears that there are three options that the District should consider: 1) voluntary rebate program to provide incentives for non-compliant wood heater upgrades in areas impacted with higher PM2.5 levels, 2) targeted mandate that would require households with non-compliant wood heaters to upgrade wood heaters with a longer implementation period and administered by the District, or 3) a combination of the rebate/mandate approach identified above. Utilities and wood heater manufacturers could be involved as partners in any approach selected.

Staff Response: AQMD staff concurs that there may be implementation options for the paragraph (d)(6) property transfer requirements that may need to be invoked in 2011 and intends to provide funding for voluntary change-out program that could further minimize the implementation impacts of this provision but does not agree that including this provision during property transfers is an unreasonable approach. Staff is aware that voluntary non-compliant wood heater change-out programs have been successfully implemented in other regions and has initiated contacts with both utility and wood heater manufacturer representatives to implement such a program here. Any such beneficial program would be implemented in conjunction with the outreach program.

Comment 8: Recent data suggests that each $1,000 increase in the median price of a home negatively affects 0.06 percent of the population. The estimated $4,000 to remove and replace an older wood stove would significantly increase the number of persons that would not be able to afford a home purchase due to the cost implications at the point of sale.

Staff Response: Removal and replacement of an older wood heater is one compliance option. Another, less expensive option would be for the owner to render the device permanently inoperable. As mentioned above, efforts to secure utility-based or hearth product retailer-based incentives for the replacement of older wood heaters would be anticipated to reduce the implementation costs for the property transfer requirements.

D. New Construction, Paragraph (d)(1) Requirements

Comment 9: The staff report does not demonstrate the nexus between restrictions on new construction throughout the entire District, and the need to focus on particulate levels in the areas of greatest concern. The majority of the occupied portion of the District is already built out and any restrictions on new homes will have virtually no impact on those existing communities, and will instead only impact the fringe of the District.

Staff Response: The reader is referred to the response to comment # GR-5. In addition, the Basin is not totally built-out. A large amount of residential construction and demolition/remodel is ongoing in various areas throughout the inland areas. Residential expansions are occurring in northern and eastern Los Angeles County, eastern (Coachella Valley) and western San Bernardino and Riverside Counties, and mountain areas of Orange County. Areas of urban redevelopment are also occurring throughout the Basin.

Comment 10: The District should partner with members of the hearth products industry to implement effective public information programs to educate homeowners about cleaner burning options that reduce emissions from residential combustion. Public education about cleaner burning practices with episodic controls that voluntarily discourage or prohibit residential wood burning on bad days have proven to be very effective.

Staff Response: Staff agrees. In conjunction with the public awareness provisions of the rule, including other public outreach efforts, staff will work with any willing member of the hearth products association to inform the public about the rule, its requirements, and to educate the public about cleaner burning alternatives.

E. New Low Emission Fireplace

Comment 11: The District should allow the use of new low emission wood fireplace technology, similar to that of EPA certified wood heaters and wood pellet stoves. This technology is under development by U.S. EPA and other stakeholders as a part of an ASTM (formerly, the American Society of Testing and Materials) subcommittee process. This voluntary certification program was started precisely for wood fuel, focusing on PM2.5.

Staff Response: Staff agrees. Based on the information provided through the working group process, staff has included the Low Emission Fireplace in the list of cleaner burning technologies that can be built in conjunction with new construction activities. Please also refer to response to comment GR-8.

Comment 12: We are all for an open process leading to clear standards and fair rules. The low emission fireplace ASTM standards currently under development will be much better standards than the much argued over standards that have to date been offered as "equivalent" to the EPA stove standard. It is hoped that the new Rule 445 will have a "place holder" for the new ASTM standards and, in the meanwhile, permit masonry fireplaces that meet the Colorado or Washington standards for fireplaces and masonry heaters that are "equivalent" to the EPA stove standards as shown by testing in an EPA certified test lab.

Staff Response: Staff's intent behind relying on the low emission fireplace standard that is determined to meet the criteria established by the U.S. EPA Voluntary Low Emission Fireplace program is designed to have a consistent national standard that would be easy to understand and avoid confusion. The Colorado and Washington standards for fireplaces and masonry heaters establish programs by which equivalency would have to be evaluated and approved at the local level. It is preferred that, under Proposed Rule 445, all approved devices be evaluated and demonstrated as equivalent consistently at the national level, not at the local level to ease administration for all parties concerned. Approval of a test protocol emission standard is expected this year.

F. Outdoor Appliances and Cookstoves

Comment 13: Will backyard (patio) wood burning units be addressed by the wood burning curtailment program included in the proposed rule?

Staff Response: As mentioned, the previous mandatory wood burning curtailment program has been removed from the proposed rule. A voluntary wood burning curtailment program will be implemented in conjunction with the Proposed Rule 445 outreach and education program. During a voluntary wood burning curtailment notice persons would be asked to not operate any outdoor wood burning units. Future construction of outdoor wood burning appliances, such as those requiring a permit, would be subject to the construction requirements of paragraph (d)(1).

Comment 14: How are campfires and beach (bon fire) fires affected by the proposed rule?

Staff Response: They are not. Proposed Rule 445 is focused on wood burning appliances alone. Camp and beach fires would not fall under the purview of this rule.

Comment 15: Are pizza ovens included in the definition of cookstoves?

Staff Response: No. Paragraph (c)(3) of Proposed Rule 445 defines cookstoves and subparagraph (g)(1) exempts cookstoves The paragraph (c)(4) definition states that cookstoves are defined under Title 40 of the Code of Federal Regulations (CFR) Section 60.531. The CFR generally defines cookstoves as a wood-fired appliance that is primarily designed for cooking and has the following characteristics: 1) an oven with an oven rack with a volume of one cubic foot or greater, 2) a device for measuring oven temperature, 3) a flame path that is routed around the oven, 4) a shaker grate, 5) an ash pan, 6) an ash clean-out door beneath the oven, and 7) the absence of a fan or heat channels to dissipate heat from the appliance. A wood-fired pizza oven that meets this definition would be exempt from Proposed Rule 445.

G. Episodic Curtailments

Comment 16: The episodic curtailment program should not be based on the agricultural burn forecast contained in District Rule 444 because some of the no burn indicators used in District Rule 444 are based on ozone. A separate forecast for wood burning would be more appropriate and based on PM2.5 values. Any future forecasting system should be made by 3:00 pm to be applicable for the upcoming evening and should be made at the sub regional level (i.e., costal, inland, etc.).

Staff Response: Staff agrees. Staff has received a number of comments during the comment period and through the working group process relative to the form and implementation of the wood burning curtailment program. As a result, the voluntary wood burning curtailment program will not be based on solely on Rule 444 forecast; however, it must not conflict either. As currently envisioned, the voluntary wood burning curtailment program will be issued on any day that the Executive Officer determines that air quality conditions are not suitable for wood burning due to the potential for adverse health effects. These forecasts will be conducted daily throughout the year. It is envisioned that one of the triggers for issuing a voluntary wood burning curtailment notice will be when the AQI is forecast to be 100 or more. The program would advise the public to refrain from operating a wood burning appliance and to use cleaner burning technologies or other alternatives as suggested by the District. The reader is referred to the discussion of this provision in the revised preliminary draft staff report.

Comment 17: Many air districts have implemented a multi-stage episodic control program whereby a lower air quality threshold trigger is used for a traditional, uncontrolled fireplace and a higher threshold is used for an EPA Phase II-certified wood burning device. This policy encourages the consumer to purchase cleaner technology, including pellet stoves.

Staff Response: Staff agrees that the curtailment program and efforts to increase public awareness are important elements that will educate the public about wood burning and potential health effects and would result in the use of cleaner burning technologies and methods. This has worked well in other jurisdictions; however, at this stage, staff believes that a two threshold program is not necessary.

Comment 18: The wood burning prohibitions are a good idea but it seems like there should be more than the anticipated three to four prohibitions to achieve the air quality goals.

Staff Response: The mandatory curtailment program based on District Rule 444 forecasts that was included in the preliminary draft staff report has been removed and the wood burning curtailment program is now proposed to be voluntary. Staff anticipates that, under this voluntary program, up to 80 to 100 advisories will be issued during the year-round program. The commentator is also referred to response to comment number 16.

Comment 19: Improve cooperation with the proposed episodic curtailment periods by revising the proposal to include advice to use clean burning technologies, such as manufactured firelogs in wood burning fireplaces, as well as the burning of pellet heaters and U.S. EPA Phase II-certified wood heating appliances.

Staff Response: Staff will seek to reduce wood burning during periods of poor air quality through the voluntary wood burning curtailment program. This would include "…voluntary ceasing of the operation of a wood burning appliance or portable outdoor wood burning appliance; use of cleaner burning technologies including those specified in paragraph (d)(1); or other alternatives as suggested by the Executive Officer." During implementation, staff will be investigating "other alternatives" to wood burning, including firelogs. Staff recognizes that the test data provided indicates the lower emitting potential (including toxics) of some firelogs, but this must be investigated further before concluding that these densified logs are indeed cleaner alternatives for the public to use.

Comment 20: The episodic control program is the single most effective tool to address wood smoke on a 24 hour basis. These programs are the most effective at addressing the majority of wood burning households, the fireplaces users. As the District's inventory indicates, the majority of PM2.5 from residential wood combustion in the air basin is generated by the burning of wood in open fireplaces. A carefully introduced program can have profound impacts, much greater than any other element of the rule.

An episodic control program should include several key attributes: 1) no-burn forecasts must be accurate; 2) they must be simple to explain and timely; and 3) they must include incentives to accelerate the change out of the old appliance.

Staff Response: Staff agrees that a curtailment program can be a useful component of a wood smoke control program. However, approximately two-thirds of the emissions (6.3 tons per day) are coming from conventional pre-EPA certification wood heaters (i.e, wood stoves). Uncontrolled, open fireplaces account for just under one-third of the emissions (3.1 tons per day). Staff believes the proposed voluntary wood burning curtailment program encompasses each of the suggested attributes.

AGENCY COMMENTS AND RESPONSES

The following comments were received from the federal Environmental Protection Agency, Region IX, and the California Air Resources Board (CARB), and are followed by staff responses.

Comment 1: We have preliminarily reviewed the draft rule. This draft rule is important for regulating wood burning appliances and we have no recommended changes. If adopted and submitted to us as drafted, we would likely fully approve it. (EPA, Region IX)

Staff Response: Staff appreciates the support in this rule development effort.

Comment 2: The rule is good first step and we commend the District for pursuing regulation in this area. However, due to the severity of the PM2.5 problem in the South Coast Air Basin, the staff of the Air Resource Board believes the rule should be more stringent. (CARB)

1. As drafted, the rule sets a limit of one wood burning appliance in new home for sale and constructed after January 1, 2008. The rule should limit the number of appliances based on dwelling density to effectively reduce the number of new appliances in residential areas with a higher population density. See San Joaquin Unified APCD Rule 4901.
2. A section should be added to limit the number of additional wood burning appliances that may be installed in existing residential and non-residential properties. See Rule 431 adopted by Great Basins Unified APCD for the Town of Mammoth Lakes.
3. There are three points of concern regarding the proposed prohibition of property sale or transfer in the event "any area has an annual average PM2.5 concentration above 20 $\mu g/m^3$.
    a. The definition of area should be clear. It is it the entire county? Data indicates the requirement would only be applicable to the Riverside area.
    b. Annual average concentration is not a good indicator for residential wood combustion since most of it takes place during November and December. A better indicator is the 24-hour PM2.5 concentration.
    c. Rather than using a concentration above 20 $\mu g/m^3$, the requirement should apply to areas with the PM2.5 concentrations above the new national standard of 35 $\mu g/m^3$.

Staff Response: Staff does not see the need to include these elements at this time for the reasons stated below. The contribution of wood smoke from residential and commercial combustion to PM2.5 levels in the District is less than the contribution/burden of other jurisdictions referenced in parts 1 and 2 of the comment. However, the emissions are not insignificant and at various times during the winter months can be 10 to 30 percent of the total PM2.5 concentration at various locations and times throughout the District. Since the possibility exists that meeting the ambient air quality standard for PM2.5 may not occur and further reductions may be needed, a contingency is warranted and the resolution for the proposed rule will include a directive to staff to return to the Governing Board for consideration of additional PM2.5 emission reduction strategies, including, but not limited to more stringent requirements, as suggested, based on density and requirements affecting existing homes.

Relative to part 3, an area greater than 20 $\mu g/m^3$ would be established based on ZIP Codes. This would be an easy indicator of affected areas, would allow refinement of the area to a sub-region of the county, and would be inclusive of unincorporated areas. Because the South Coast Air Basin is required to attain the federal annual average PM2.5 standard by 2015, several years prior to the recently revised federal 24 hour PM2.5 standard, and given the temporal and geographic variability of the 24-hour PM2.5 concentration observed, staff is recommending that the present structure of the proposed rule be based on annual average

concentration thresholds but will be open to consider a 24-hour based threshold in the future. It should be mentioned; however, that the federal 24-hour PM2.5 standard level plays a key role as a trigger mechanism for the proposed voluntary wood burning curtailment program which staff judges to be the most effective measure contained in this proposal.

CONCLUSION

Proposed Rule 445 will implement 2003 AQMP control measure MSC-06 (PM Emissions from Wood Burning Fireplaces and Stoves) and will require the phase-in of the cleanest wood burning technology. Proposed Rule 445 will also inform the public about clean burning alternatives and when air quality or meteorological conditions are not favorable for wood burning. Emissions reductions from the mandatory components of Proposed Rule 445 have been estimated at approximately 25 tons per year by 2008, 175 tons per year by 2014. Additional reductions are anticipated from the implementation of the voluntary curtailment program. Proposed Rule 445 will also facilitate attainment of State and federal particulate air quality standards.

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